





# **Outcome and Challenges**

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# **The WRC Purpose**

- ✓ Updates the ITU Radio Regulations (new version as of 1.1.2021)
- Adopts Resolutions and Recommendations
- Held every ~4 years next one WRC-23



- ITU Radio Regulations Legal bindings doc treaty status <u>https://www.itu.int/pub/R-REG-RR/en</u>
  - Incorporates the WRC decisions
  - 4 Volumes (Articles/Appendices/Resolutions/ITU-R Rec inc. ref.)
  - Table of Frequency Allocations (ART 5)
  - Coordination (ART9) & Notification (ART11) procedures & Plans
  - Provisions for services and stations and sharing





### https://www.itu.int/go/wrc-19

# WRC-19 key facts

✓ 17 Specific Agenda Items (AI) and 6 standing AI
 ✓ 568 contributions and documents treated by the WRC-19
 ✓ Paperless World conference in 6 Languages (E/F/S/A/C/R)

- WRC-19 Provisional Final Acts (PFA) (567 pages) signed on 22.NOV.2019
   WRC-19 Resolutions enter into force at the time of the signing of the PFA WRC-19
- Updated version of the RR shall enter into force on 01.JAN.2021
   For exceptions see PFA WRC-19 ART 59 and RES-99

# https://www.itu.int/go/wrc-19

#### **Most important topics - WRC-19 AI with** *impact on the space services*

AI / Topic					
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	<b>1.2) EIRP</b> for ES MSS, EESS, MetSS 401- 403 & 399.9 - 400.05 MHz RES-765		1.6) Non-GSO FSS in Q/V bands RES-159		
	1.7) TT&C SOS for n-GSO SDM RES-659		7) Changes / other options on API, CR or Notification procedures RES-86		
	1.8) GMDSS & MMSS L band (s-E) RES-359 1.9.2) MMMS - VDS VHF band	SHARM EL-SHEIKH2019 28 October - 22 November Sharm El-Sheikh, Egypt	10) WRC-23 Agenda and preliminary WRC-27 Agenda		

#### Maritime issues WRC-19 Agenda Items 1.8



# • AI-1.8 RES-359 (WRC-15)

Studies to consider possible regulatory actions to support GMDSS (Global Maritime Distress and Safety Systems) modernization and the introduction of additional satellite systems into the GMDSS, protection of existing systems

### WRC-19 AI 1.8 - GMDSS satellite Decision

#### WRC-19 decision - <u>Applicable as of 23.NOV.2019</u>

- Upgrade the status of band 1 621.35-1 626.5 MHz from a secondary to a PRIMARY allocation for the MMSS (s-E) -Nos 5.INBAND, 5.ADJBAND - status of all other allocations in 1 613.8-1 626.5 MHz remain unchanged
- ✓ MOD No. 5.368 and identification of the band 1 621.35-1 626.5 MHz in RR AP 15 for <u>GMDSS purpose</u>;
- MOD No. 5.372, in order to make mandatory and quantify the protection of the RAS, introducing epfd limits by all space stations of a n-GSO MSS (s-E) operating in frequency band 1 613.8-1 626.5 MHz



#### Maritime issues WRC-19 Agenda Item 1.9.2



• AI-1.9.2 RES-360 (WRC-15) Studies to consider RR MODs. including new MMSS (E-s & s-E) allocations, preferably within 156.0125-157.4375 MHz & 160.6125-162.0375 MHz of RR **AP18**, to enable a new VDES (VHF Data Exchange System) satellite component

#### WRC-19 AI 1.9.2 - VDES Decision

#### WRC-19 decision:

No. **5.A192** The use of the frequency bands 157.1875-157.3375 MHz and 161.7875-161.9375 MHz (E-s) & (s-E) by the MMSS is limited to n-GSO satellite systems operating in accordance with Appendix **18** (see also REC-ITU-R **M.2092**)



#### Space Science issues WRC-19 Agenda Item 1.2



 AI-1.2 RES-765 (WRC-15) Studies to consider in-band power *limits* for ES in MetSat and EESS 401-403 MHz (E-s) and in the MSS in 399.9-400.05 MHz (E-s) band in order to be able to provide long-term continuity for the operation of low power *levels* Data Collection Systems(DCS) by satellite

#### WRC-19 AI 1.2 - DCS Decision

Applicable as of 23. NOV. 2019



- 5.A12 In 399.9-400.05 MHz, the max e.i.r.p. ES MSS shall not exceed 5 dBW
  - Until 22 NOV 2022 this limit shall not apply to satellite systems for which complete notification has been received by the Bureau by 22 NOV 2019 and that <u>have been brought into use by that date</u>
  - > After 22 NOV 2022 these limits shall apply to all ES MSS in this band
  - In the frequency band 399.99-400.02 MHz, the e.i.r.p. limits as specified above shall apply after 22 NOV 2022 to all ES MSS

• 5.B12 In 400.02-400.05 MHz, 5.A12 not applicable for ES MSS (E-s) TT&C



#### • 5.C12

- Until 22 NOV 2029 limits shall not apply to satellite systems for which complete notification has been received by the Bureau by 22 NOV 2019 and that <u>have been brought into use by that date</u>.
- > After 22 NOV 2029 these limits shall apply to all ES MetSS and EESS operating in this frequency band
- 5.D12 Non-GSO MetSS & EESS for which complete notification information has been received by the Bureau before 28 APR 2007 are exempt from No. 5.C12 and ES may continue to operate in 401.898-402.522 MHz on a PRIMARY basis without exceeding a maximum e.i.r.p. level of 12 dBW

#### Space Science issues WRC-19 Agenda Item 1.7



# AI-1.7 RES-659 (WRC-15) Study the spectrum needs for TT&C in the SOS for non-GSO satellites with Short Duration Missions (SDM)

#### WRC-19 AI 7(I) - n-GSO SDM Decision

#### WRC-19 decision:

RES-COM5/5 (WRC-19) - Regulatory procedures for frequency assignments to non-GSO satellite systems identified as Short-Duration Mission (SDM) not subject to the application of Section II of Article 9

#### non-GSO **SDM** satellite system:

- Any space service on bands not subject to coordination-Section II of ART9
- Special provisions for non-GSO SDM SOS in 137-138 MHz (s-E) and 148-149.9 MHz (E-s)
- Total number of satellites in a n-GSO SDM system shall not exceed **10** satellites
- A single launch date/DBiU shall be defined as the launch date associated with the first launch (in case of a system with multiple launches)
- Notification only after the launch of the first satellite, and not later than two months after the launch
- The max period of operation and validity of frequency assignments shall not exceed 3 years from the launch/DBiU without any possibility of extension
- Nos. 11.43A, 11.43B (changes) and 11.49 (suspension) shall not apply to non-GSO SDM

#### WRC-19 AI 1.7 - n-GSO SDM SOS - 137-138 MHz - Decision 1

SO	<b>S (SDM)</b>	SOS (SDM) 5.AA17	SOS (SDM)
	5.A17	SOS (SDM) 5.A17	
SO	S (s-E)	SOS (s-E)	SOS (s-E)
Met	SS (s-E)	MetSS (s-E)	MetSS (s-E)
SR	S (s-E)	SRS (s-E)	SRS (s-E)
f	ixed	fixed	fixed
m	nobile	mobile	mobile
MSS (s-E)	mss (s-E)	MSS (s-E)	mss (s-E)
137.02	25 MHz		
		$\land$	

AM(R)S (108-137 MHz) pfd -140 dB(W/(m<sub>2</sub> · 4 kHz

**5.A17** The use of the SOS (s-E) with **non-GSO SDM** in the band 137-138 MHz is subject to RES **COM5/9** (WRC-19). RES **COM5/5** (WRC-19) applies. These systems shall not cause harmful interference to, or claim protection from, the existing services to which the frequency band is allocated on a primary basis.

5.AA17 The use of the freq. band 137.175-137.825 MHz by non-GSO SDM SOS is not subject to No. 9.11A.

#### WRC-19 AI 1.7 - n-GSO SDM *SOS - 148-149.9 MHz -* Decision 2



**5.BB17** The frequency band 148-149.9 MHz in the SOS (E-s) maybe used by **non-GSO SDM**. Non-GSO SDM in accordance with RES **COM5/5** (WRC-19) of the RR are not subject to agreement under No. **9.21**. At the stage of coordination, the provisions of Nos. **9.17** and **9.18** also apply. In the frequency band 148-149.9 MHz, non-GSO SDM shall not cause unacceptable interference to, or claim protection from, existing primary services within this frequency band, or impose additional constraints on the SOS & MSS. In addition, non-GSO SDM ES in the frequency band 148-149.9 MHz shall ensure that the pfd does not exceed -149 dB(W/(m2 · 4 kHz) for more than 1% of time at the border of the territory of the following countries: [list of *16 ADM*...]. In case this pfd limit is exceeded, agreement under **No. 9.21** is required to be obtained from countries mentioned in this footnote.

#### WRC-19 AI 7 - ART 9 Decision

**MOD 9.1** Before initiating any action under Article **11** in respect of frequency assignments for a satellite network or system not subject to the coordination procedure described in Section II of Article 9 below an administration..., shall send to the Bureau a general description of the network or system for advance publication (API) in the BR IFIC *not earlier than seven years* and *preferably not later than two years before the planned date of bringing into use* of the network or system.

The *Notification* information may also be communicated to the Bureau at the same time, but shall be considered as having been received by the Bureau *not earlier than* six four months after the date of publication of the API

**MOD 9.2B** On receipt of the complete information sent under Nos. **9.1** and **9.2**, the Bureau shall publish it in a Special Section [API/A] of its BR IFIC within three two months

#### WRC-19 AI 7 (I) - ART 9 Decision - impact

ART 9 & 11 submission process timeline for non-GSO satellite networks NOT subject to ART 9 Coordination - RR@2016



#### Satellite issues - WRC-19 Agenda Item 1.5



# AI-1.5 RES-158 (WRC-15) Studies to consider the use of the bands 17.7-19.7 (s-E) & 27.5 29.5 GHz (E-s) by *earth stations in motion* (ESIM) communicating with GSO space stations in the FSS and take appropriate action

#### **\*** Earth Stations in Motion (ESIM)

- mobile Earth station (ES) that operates in the GSO FSS
- shall operate / communicate within the envelope of typical ES of that GSO FSS satellite network
- Three types / regulatory issues of ESIM
- > Aeronautical ESIM on the board of aircraft line of sight & authorisation + pfd
- > Maritime ESIM on the board of vessel distance from the coast & authorisation + e.i.r.p
- > Land ESIM on the land mobile platform cross-border issue + No interference to TER

#### WRC-19 decision: applicable as of 01.JULY.2020

- **RES-COM5/6** (WRC-19) Use of the frequency bands 17.7-19.7 GHz (s-E) and 27.5-29.5 GHz (E-s) by earth stations in motion (ESIM) communicating with GSO FSS
- Frequency band used by ESIMs are also allocated to *TER and SPACE services need to be protected*;
- *No different regulatory status* to ESIMs from the GSO ES FSS with which they communicate and this RES;
- Operation of ESIMs within the territory (including territorial waters and territorial airspace) of an ADM shall be carried out only if authorized by that ADM;

#### WRC-19 AI 1.13-1.14- 1.6 Q/V band Decisions

# Q/V band battle?

#### MS Broadband IMT-2020 WRC-19 Agenda Item 1.13

#### • AI-1.13 RES-238 (WRC-15)

The following bands, which are already allocated to mobile, with a view to an *IMT-2020 identification* 

(U) (D)





#### **Introduction of new IMT applications**

- enhanced Mobile BroadBand (eMBB)
- massive Machine-Type Communications (**mMTC**)
- Ultra Reliable and Low-Latency Communications (URLLC)



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#### FS Systems/HAPS WRC-19 Agenda Item 1.14



• AI-1.14 RES-160 (WRC-15)

Studies for considering **appropriate regulatory actions for H**igh-**A**ltitude **P**latform **S**tations (**HAPS**), within existing FS allocations or study new bands: 21.4-22 & 24.25-27.5 and **38-39.5 GHz** 



HAPS platform shall remain at a "specified, nominal, fixed point" and may change altitude over time within a "regulatory bounded cylindrical volume upper and lower limits" (RR No. 1.66A)

#### Satellite issues in Q/V band - WRC-19 Agenda Item 1.6



# • AI-1.6 RES-159 (WRC-15)

Studies on development of a *regulatory framework* for **non-GSO FSS** systems that may operate in the bands 37.5-39.5 (s-E), 39.5-42.5 (s-E), 47.2-50.2 (E-s), 50.4-51.4 (E-s) GHz

#### WRC-19 AI 1.6 - Q/V non-GSO FSS+MSS and IMT2020 and HAPS Decision

AI to consider the development of a regulatory framework for non-GSO FSS satellite systems that may operate in the frequency bands 37.5-39.5 GHz (s-E), 39.5-42.5 GHz (s-E), 47.2-50.2 GHz (E-s) and 50.4-51.4 GHz (E-s), in accordance with RES-159 (WRC-15);

WRC-19 decision applicable as of 23.NOV.2019 - Nos. 5.A16 & 5.B16 apply (subject to No. 9.12...)

**RES-COM5/12** (WRC-19) Use of the [*Q/V frequency bands*] by non-GSO FSS and MSS

 for notification has been received by the Bureau before 23 NOV 2019 shall be brought into use before 23 NOV 2022 or the end of the regulatory period set forth in No.11.44, whatever date comes earlier
 frequency assignments that are <u>not brought into use</u> before 23 NOV 2022 or the end of the regulatory period set forth in No.11.44, whatever date comes earlier, <u>shall be suppressed</u>

RES-COM5/11 (WRC-19) Application of RR ART 22 to protect GSO FSS & BSS from non-GSO FSS systems in the [Q/V bands]

technical characteristics of generic GSO ref. links contained in *Annex 1* shall be used in conjunction with the *procedures for the evaluation of interference from a non-GSO into GSO ref. links in Annex 2* to determine compliance with No. 22.5L
 non-GSO FSS systems referred to in *resolves 1* shall receive a *favourable finding* with respect to the *single-entry provision* given in No. 22.5L, if compliance with No. 22.5L is established under *resolves 1*

**RES-COM5/10** (WRC-19) *Protection of GSO FSS,BSS&MSS from the aggregate interference* produced by multiple non-GSO **FSS** systems in the [*Q/V frequency bands*]...

1) ADM operating non-GSO FSS systems, shall jointly, take all necessary steps, including mod to the operational characteristics, to ensure that the aggregate interference impact to GSO FSS... caused by such systems does not exceed the aggregate limits specified in No.22.5M

- AI 1.13 IMT2020 in Q/V bands WRC-19 decision:
- ✓ Agreed on IMT 2020 *identification* and conditions for the bands 37-43.5, 45.5-47 and 47.2 48.2 GHz
- RES-COM4/9 (WRC-19) Terrestrial component of IMT within the bands 37-43.5 and 47.2-48.2 GHz, RES-COM4/10 (WRC-19) IMT in the frequency band 45.5-47 GHz

#### AI 1.14 - HAPS in Q/V bands - WRC-19 decision:

- Agreed on Global HAPS <u>identification</u> and conditions for the band 38-39.5 GHz
- RES-COM4/6 (WRC-19) Use of the frequency band 38-39.5 GHz by HAPS, MOD RES-122 (WRC-19) Use of the frequency band 47.2-47.5 & 47.9-48.2 GHz by HAPS

**Q** band (downlink) - 37.5-39.5 & 39.5-42.5 (s-E) GHz non-GSO **FSS** & 39.5-40.5 (s-E) GHz non-GSO **MSS** 



V band (uplink) - 47.2-50.2 (E-s) and 50.4-51.4 GHz (E-s) non-GSO FSS

47.2 GHz	47.5 GHz IMT IMT IMT INT	IMT+HAPS non-GSO FSS 5.A16	48 OFF non-GSO FSS 5.A16	50.2 GHz	50 4 GHz non-GSO FSS 5.A16
FS-HAPS	FS	FS-HAPS	FS	EESS (pas)	FS
FSS (E-s)	FSS (E-s)	FSS (E-s)	FSS (E-s)	SRS (pas)	FSS (E-s)
MOB	MOB	MOB	MOB		MOB
				_	mss (E-s)

#### Space REGULATORY issues - WRC-19 Agenda Item 7

AI 7 to consider possible changes, and other options, in response to RES-86 of the Plenipotentiary Conference, an advance publication, coordination, notification and recording procedures for frequency assignments pertaining to satellite networks, in accordance with RES-86 (Rev.WRC-07), in order to facilitate rational, efficient and economical use of radio frequencies and any associated orbits, including the GSO

#### 11 issues identified under AI 7 and consideration of Dir Rep (AI 9.2) & RRB Rep (AI 9.3)

- Issue A Bringing into use of frequency assignments to all non-GSO systems, and consideration of a milestone-based approach for the deployment of non-GSO systems in specific frequency bands and services
- Issue B Application of coordination arc in the Ka-band, to determine coordination requirements between the FSS and other satellite services
- Issue C Issues for which consensus was achieved in ITU-R and a single method has been identified
- Issue D Identification of those specific satellite networks and systems with which coordination needs to be effected under RR Nos. 9.12 (n-GSO-to-n-GSO), 9.12A (n-GSO-to-GSO) and 9.13 (GSO-to-n-GSO)
- Issue E Resolution related to RR Appendix 30B
- Issue F Measures to facilitate entering new assignments into the RR Appendix 30B List
- Issue G Updating the reference situation for Regions 1 and 3 networks under RR Appendices 30 and 30A when provisionally recorded assignments are converted into definitive recorded assignments
- Issue H Modifications to RR Appendix 4 data items to be provided for non-GSO satellite systems
- Issue I Regulatory procedure for non-GSO satellite systems with short-duration missions (SDM)
- Issue J Pfd limit in Section 1, Annex 1 of RR Appendix 30
- Issue K Difficulties for Part B examinations under § 4.1.12 or 4.2.16 of RR Appendices 30 and 30A and § 6.21 c) of RR Appendix 30B
- Agenda item 9.2 Director's Report on any difficulties or inconsistencies encountered in the application of the Radio Regulations
- ✓ Agenda item 9.3 RRB report on action in response to RES-80

# WRC-19 AI 7 (A) - ART 11 BIU Decision

**MOD 11.44B** A frequency assignment to a space station in the <u>GSO</u> shall be considered as having been brought into use when a space station in the GSO with the capability of transmitting or receiving that frequency assignment has been deployed and maintained at the notified orbital position for a <u>continuous period of 90 days</u>. The notifying ADM shall so inform the Bureau within 30 days from the end of the 90-day period...**RES-40** shall apply

**MOD 11.44C** A frequency assignment to a space station in a **non-GSO** system in the **FSS**, **MSS** or **BSS** shall be considered as having been brought into use when **a space station** with the capability of transmitting or receiving that frequency assignment has been deployed and maintained **on one of the notified orbital plane**(s) of the non-GSO system for a continuous period of 90 days, irrespective of the notified number of orbital planes and satellites per orbital plane in the network or system. The notifying ADM shall so inform the Bureau within 30 days from the end of the 90-day period...

**MOD 11.44D** A frequency assignment to a space station in a **non-GSO** system with "Earth" as the reference body, other than a frequency assignment to which No. **11.44C** applies, shall be considered as having been brought into use when a space station with the capability of transmitting or receiving that frequency assignment has been deployed **on one of the notified orbital plane**(s) of the non-GSO system, irrespective of the notified number of orbital planes and satellites per orbital plane in the system. The notifying ADM shall so inform the Bureau as soon as possible, but not later than 30 days after the end of the period under No. **11.44** 

**MOD 11.44E** A frequency assignment to a space station in a **non-GSO** system with a the reference body that is <u>not "Earth"</u>, shall be considered as having been brought into use when *the notifying ADM informs the Bureau that* a space station with the capability of transmitting or receiving that frequency assignment has been deployed *in accordance with the notification information*. The notifying ADM shall so inform the Bureau as soon as possible, but not later than 30 days after the end of the period under No. **11.44** 

#### Non-GSO FSS satellite system & the RR - 1

There is no formal regulatory definition in the RR related to "Satellite large "MEGA" constellation"

It can be considered as a constellation comprised of a group of non-GSO satellites operating in the frequency bands allocated to the Fixed-Satellite service (FSS) (No.1.21)

- with similar characteristics and functions
- operating in a similar or complementary orbital planes at LEO, MEO or HEO
- under a shared control
- for a coordinated ground coverage

No.22.2 Non-GSO systems shall not cause unacceptable interference to / not claim protection from GSO FSS & BSS (ULTIMATE protection)

According to No.22.5I - No.22.2 obligation is *fulfilled* by the non-GSO FSS, *if they comply with epfd limits*, given in Tables 22-x of ART 22 without requiring individual coordinations with all GSO systems worldwide

#### Non-GSO FSS EPFD & the RR - 2

- Equivalent power-flux density (epfd) takes into account the aggregate of the emissions produced from all space stations of a non-GSO satellite system in the FSS in the direction of any GSO satellite and GSO ES, taking into account the GSO antenna directivity
- **epfd** considers *pointing of a victim receiving antenna* with respect to any source of interference
- complex calculation methodology considers an interference varying in time and space



# WRC-19 AI 7 (A) - non-GSO FSS BiU & milestone Decision 1

- **RES COM5/7** (WRC-19) A milestone-based approach for the implementation to space stations in a non-GSO system in *specific frequency bands and services* (\*\*very complex RES - 10 pages...\*\*)
- ITU-R non-GSO FSS studies results:
- > ADM may require longer than the 7 years regulatory period (No. 11.44) to complete implementation of non-GSO FSS/MSS/BSS systems
- Adoption of a milestone-based approach will provide a regulatory mechanism to help ensure that the MIFR reasonably reflects the actual deployment of such non-GSO systems and improve the efficient use of the orbital/spectrum resource in those frequency bands and services
- in defining the timeline and objective criteria for the milestone-based approach, there is a need to seek a balance between the prevention of spectrum warehousing, the proper functioning of coordination mechanisms, and the operational requirements
- adherence to fixed milestone periods is desirable, as this creates certainty with respect to the deployment
- ✓ Specific frequency bands in Ku, Ka, Q and V applicable to non-GSO systems in FSS, BSS or MSS - see resolves 1 Table

# WRC-19 AI 7 (A) - non-GSO FSS BiU & milestone Decision 2

- resolves 2) for frequency assignments to which resolves 1 applies, and for which the end of the 7-year regulatory period specified in No. **11.44** is on or <u>after 1 JAN 2021</u>, the notifying ADM shall communicate the required deployment info (Annex 1 to this RES) no later than 30 days after the end of the regulatory period in No. **11.44** or BiU in No. **11.44C**, whichever comes later
- resolves 3) for frequency assignments to which resolves 1 applies, and for which the end of the 7-year regulatory period specified in No. **11.44** has expired <u>prior to 1 JAN 2021</u>, the notifying ADM shall communicate the required deployment info (Annex 1 to this RES) no later than **1 FEB 2021**
- resolves 5) if the number of satellites under resolves 2 or 3 above is **100%** of the total number of satellites indicated in the MIFR, milestone resolves 6 to 17 are not applicable
- resolves 11) resolves 10a) shall not apply for frequency assignments for which the end of the seven-year regulatory period in No. 11.44 is before 28 November 2022, provided that the notifying ADM submits the complete information listed in Annex 2 to this RES to the Bureau by 1 March 2023, and a favourable determination is made by the RRB or WRC-23

#### WRC-19 AI 7 (A) - non-GSO FSS BiU & milestone Decision 3

resolves 2 (No.11.44 on/after 1JAN 2021) period under resolves 6	resolves 3 (No.11.44 expired prior 1JAN 2021) dates under resolves 7	<i>resolves 10</i> number of space stations <b>declared as deployed</b> under resolves 6 or 7 is equal or more as	resolves 10 <b>ADM shall submit a MOD</b> to the <i>notified characteristics</i> if the number of space stations <i>declared as deployed</i> is
a) 30 days after the expiry of the <b>2-year</b> <b>period</b> after No. <b>11.44</b> ( <i>i.e.</i> 9 years after CR submission)	a) no later than <b>1 FEB 2023</b> (i.e.1JAN+30days)	a) ≥10% of the total number of satellites - OK	a) <10% - the modified total number of satellites <i>shall not be greater</i> <i>than ten (10) times</i> the number of space stations declared as deployed under <i>resolves 6a) or 7a)</i>
<i>b) 30 days after</i> the expiry of the <b>5-year</b> <b>period</b> after No. <b>11.44</b> ( <i>i.e. 12 years after CR</i> <i>submission</i> )	<i>b) no later than</i> <b>1 FEB 2026</b> (i.e.1JAN+30days)	b) <b>≥50% of the</b> <b>total</b> number of satellites - <b>OK</b>	b) <b>&lt;50%</b> - the modified total number of satellites <i>shall not be greater</i> <i>than two (2) times</i> the number of space stations declared as deployed under <i>resolves 6b) or 7b)</i>
<i>c) 30 days after</i> the expiry of the <b>7-year</b> period after No. <b>11.44</b> ( <i>i.e. 14 years after CR</i> <i>submission</i> )	<i>c) no later than</i> <b>1 FEB 2028</b> (i.e.1JAN+30days)	c) =100% of the total number of satellites - OK	c) <100% - the modified total number of satellites <i>shall</i> <b>not be</b> <b>greater</b> than the number of space stations deployed under resolves 6c) or 7c)

# WRC-23 AL1.18 - narrowband (iOT) MSS

#### RES-COM6/1 (WRC-19) Agenda for the 2023 World Radiocommunication Conference

**AI 1.18** - to consider studies relating to spectrum needs and potential new allocations to the MSS for future development of narrowband MSS, in accordance with **RES-COM6/15** 

RES-COM6/15 (WRC-19) - Studies relating to spectrum needs and potential new allocations to the MSS in the bands 1 695-1 710 MHz, 2 010-2 025 MHz, 3 300-3 315 MHz, 3 385-3 400 MHz for future development of narrow band MSS

resolves to invite ITU-R

- 1) to conduct studies on spectrum, operational requirements and system characteristics of low-data rate systems for the collection of data from, and management of, terrestrial devices in the MSS
- 2) to conduct sharing and compatibility studies with existing primary services to determine the suitability of new allocations to the MSS, with a view to protecting the primary services, in the following frequency bands:
  - 1 695-1 710 MHz in Region 2
  - 2010-2025 MHz in Region 1

3 300-3 315 & 3 385-3 400 MHz in Region 2

resolves to invite WRC-23
 to determine, on the basis of the studies conducted under the resolves to invite ITU-R above, appropriate regulatory actions

#### WRC-19 - Decision WRC-27 Studies

RES-COM6/19 (WRC-19) Preliminary Agenda for the WRC-27

**RES COM6/26** - Study of technical and operational matters, and regulatory provisions, for **space-to-space** transmissions in the (E-s) direction in the frequency bands [1610-1645.5 and 1646.5-1660.5 MHz] and (s-E) direction in the bands [1525-1544 MHz, 1545-1559 MHz, 1613.8-1626.5 MHz and 2483.5-2500 MHz] among **non-GSO and GSO operating in the MSS** 

[xx] – subject to WRC-23 consideration and review the inclusion of these frequency bands with square brackets and decision, as appropriate

to complete these studies by the WRC-27

#### resolves to invite WRC-27

to consider the results of the above studies and take necessary regulatory actions, as appropriate

# Thank you very much for your attention !

# World Radiocommunication Conference (WRC-19) https://www.itu.int/go/wrc-19